

HYDRAULIC & WATER MANAGEMENT DEPARTMENT

Brochure

The Department

The historical era we live in requires more effort in water resources management due the increase of extreme weather events.

In this context is where ITS Hydraulic department fits in: hydraulic studies and design of reclamation and irrigation works, aqueduct and sewer networks, storm water and wastewater disposal system, and also watercourses and hydraulic invariance works.

The 30 years experience of ITS's Hydraulic engineering team allows us to find the best solution by ensuring mitigation and environmental and landscape enhancement.



Services

01 Territory Analysis (GIS)

ITS Hydraulic analyzes the territory from a cartographic perspective, carrying out territorial data processing. These analyses enable the definition of the territory's characteristics from topographic, morphological hydraulic, geological, etc., perspectives, as well in terms of criticality and constraints.

04 Numerical Modelling

The usage of the most advanced tools for the numerical modelling of natural phenomena such as floods and the inundation of streams, study of tides and wave motion. For the characterization of risk and danger, related to hydro-geological instability phenomena, one-and two-dimensional modeling are carried out.

02 Inspections and Surveys

Thanks to the experience gained in mountain and alpine environment, the technicians can access the most challenging places. In addition to the latest equipment, the team uses drones and the most advanced mountaineering techniques, also thanks to their qualification for the rope access work.

05 Design

The departments of the company work with a close cooperation, which makes it possible to define the best design solution from all points of view, such as structural efficiency, landscape, integration, effectiveness of the effects on the event to counter, and the durability.

03 Monitoring

The department can offer the most modern techniques of monitoring in the field of hydro-geological instability, such techniques are very useful in the study of landslide and general gravitational movements but are applicable to any hydro-geological instability. The combination of monitoring and the combination of detailed meteorological models makes it possible to create predictive models for forecasting sudden phenomena such as floods and debris flow.

06 Environment Assessment

ITS Hydraulic can provide engineering services in the field of environmental assessment such as EIA (Environmental Impact Assessment), SEA (Strategic Environmental Assessment), VINCA (Environmental Incidence Assessment), landscape reports, etc., These assessments are fundamental of the approval of the projects: a multidisciplinary approach is the only way to describe all the facets that characterize a project from the point of view of its impact on the environment.



Our Projects

RFI Framework Agreement - Hydraulic Assessment

Hydrological studies, hydraulic assessments and surveys for the safety and resilience of the sicilian railway infrastructure

Under the Framework Agreement with RFI - Palermo Regional Infrastructure Operations Directorate, our team is carrying out hydrogeological studies, topographical surveys and hydraulic assessments on 65 bridges serving the railway network across Sicily. The activities include field surveys, advanced hydraulic modelling and assessments of compliance with the Hydrogeological Management Plans (PAI) and Flood Risk Management Plans (PGRA).

The Hydraulic Risk Category, as defined, enables the infrastructure operator to assess the need for a monitoring system where necessary, as well as adaptation measures and alert thresholds.



Location:	Sicily, ITALY
Client:	RFI S.p.A. - DOIT Palermo
Year:	2024 - ongoing
Work amount:	€883,819.42
Categories:	D.02
Services provided:	Hydrological Studies, Hydraulic Modelling, Hydraulic Compatibility Analysis, Field Surveys

Parco della Pace

Construction of a new urban park on the site of the former Dal Molin Airport in Vicenza

The Parco della Pace, situated on the site of the former Dal Molin airport in Vicenza - planned as a compensation measure following the construction of the US military base on the remaining part of the former airport - is, with its 60 hectares of land, a real metropolitan park. The park is conceived as a large plain, shaped by a landscape of water and relief, forests, and grasslands.

In the event of heavy and prolonged rainfall, the park's drainage system acts as a flood retention basin for the rainfall volumes, allowing for a constant and regulated outflow from the park towards the final destination.

The works carried out therefore serve a dual purpose: landscape, as a significant component of the park's design, and hydraulic, as they are necessary to ensure the drainage and regulation of the design rainfall. ITS was responsible for the hydraulic design of the entire complex of canals, safety ditches, drainage systems, flow regulators and water bodies, which ensured the storage capacity of approximately 1,300 m³/ha, as determined by the hydrogeological analyses carried out.



Location:	Veneto, ITALY
Client:	Municipality of Vicenza
Year:	2018 - 2022
Work amount:	€6,000,000.00
Categories:	D.02, S.05, E.20, E.19, E.21, AI.01, V.02
Services provided:	Final and Detailed Design, Construction Supervision, Health and Safety Coordination during the Design and Construction Phases

Chiave Stream

Project to complete the hydraulic safety works on the Chiave Stream in the Old Port of Trieste

A hydraulic redevelopment project in a highly complex urban and port environment. The project concerns the safety measures for the Chiave Stream in its final stretch within the Old Port of Trieste, a strategic area characterised by significant infrastructure constraints. As a result of urban development, the stream has been entirely culverted and presents hydraulic and structural issues linked to sediment accumulation, the deterioration of the existing arches and instances of collapse, which have progressively reduced the effective flow cross-section, thereby increasing the hydraulic risk during periods of heavy rainfall.

The project aims to restore the hydraulic functionality by removing sediment, demolishing the deteriorated structures and reconstructing the channels using new structural solutions. The works involve the use of in-situ reinforced concrete elements and prefabricated box-shaped sections, suitably waterproofed and dimensioned to ensure hydraulic continuity even under critical operating conditions.

Particular attention has been paid to minimising disruption to the urban and port environment and to ensuring safety during the construction phases. The top-down construction approach reduces the need for work in confined spaces, improving operational efficiency and enhancing the overall level of hydraulic safety in the area.



Location:	Friuli-Venezia Giulia, ITALY
Client:	Autonomous Region of Friuli-Venezia Giulia - Soil Protection Service
Year:	2025 - ongoing
Work amount:	€3,161,900.00
Categories:	D.01, S.03
Services provided:	Technical and Economic Feasibility Design, Detailed Design, Health and Safety Coordination during the Design and Construction Phases, Construction Supervision

Minor Watercourse in the province of Treviso

Safety measures and restoration of the hydraulic functionality of watercourse on the left bank of the Piave - Province of Treviso

The project involves the safety measures and restoration of the hydraulic functionality of various sections of watercourses in the area on the left bank of the Piave, in the province of Treviso, covering the municipalities of Conegliano, Tarzo, Vittorio Veneto and Revine Lago. The contract, awarded by the Veneto Region - Soil Protection Department (Treviso Civil Engineering Unit), comprises detailed design, safety coordination, works supervision and technical and administrative oversight. The project forms part of a wider programme for the prevention of hydraulic risks, aimed at ensuring the proper flow of water and reducing problems associated with sediment deposits, vegetation in riverbeds and bank instability. The works involve several watercourses, including the Ruio di Conegliano, the Torrente Ferrera, the Prapian di Tarzo water system, the Tajada Canal - the outlet for the Revine lakes - the Torrente Cervano, the confluence of the Monticano River, and a hydraulic lifting plant in the locality of Scomigo. The planned works include the clearing and regularisation of riverbeds, the removal of vegetation obstructing flow, the reprofiling of hydraulic sections, the restoration of boulder bank protection, and works to improve the riverbed and stabilise the banks. At the most critical points, such as confluences, the design solutions ensure greater morphological and hydraulic continuity. Particular attention has been paid to environmental and landscape compatibility and to the management of excavated material, prioritising its reuse on site. Overall, the project contributes to improving hydraulic safety, reducing the risk of flooding and restoring the efficiency of the river network on the left bank of the Piave.



Location:	Veneto, ITALY
Client:	Veneto Region - Soil Protection (Treviso Civil Engineering Unit)
Year:	2026
Work amount:	€475,000,00
Categories:	D.02
Services provided:	Detailed Design, Health and Safety Coordination during the Design Phase

Sustainable Urban Drainage Systems

Retrofit and urban regeneration project using sustainable urban drainage systems (SuDS) in the Municipality of Cesano Maderno

An urban regeneration project focused on the sustainable management of stormwater and the reduction of flood risk in urban areas.

The project covers Corso Roma and Via Nicolò Tommaseo in the Municipality of Cesano Maderno and involves the installation of sustainable urban drainage systems in a densely urbanised area, with the aim of managing rainwater at surface level, reducing the load on the existing sewerage network and mitigating flooding. The solutions adopted include the removal of impervious surfaces and the creation of drainage features such as bioretention flowerbeds and multifunctional green systems, integrated into the regeneration of public spaces. The project improves the area’s hydraulic functionality whilst contributing to environmental quality and urban liveability.

Hydrological assessments and hydraulic modelling have shown a significant reduction in sewer flow rates, with peak flows reduced by up to 64% for design events, thanks to the combined effect of flow attenuation and infiltration provided by the drainage areas.

Overall, the project serves as an example of a resilient urban retrofit, successfully integrating green infrastructure and engineering solutions to improve stormwater management and the area’s hydraulic safety.



Location:	Lombardy, ITALY
Client:	BrianzAcque
Year:	2024 - 2025
Work amount:	-
Categories:	D.03
Services provided:	Final and Detailed Design, Hydrological and Hydraulic Modelling

Olivo Dam

Extraordinary maintenance of the spillways and containment system of the Olivo Dam in the municipality of Piazza Armerina (EN)

The project involves extraordinary maintenance of the spillways and the sealing system of the Olivo Dam, an earth-fill dam situated in the municipality of Piazza Armerina (EN) and managed by the Sicilian Regional Government - Department of Water and Waste. The work was carried out as part of the engineering of the improved technical proposal submitted by the contractor awarded the works. The improvement proposals introduce technical solutions aimed at optimising the construction phases, materials management and the dam's overall performance. Key measures include the construction of a filtering containment embankment for the controlled storage of dredged material, with on-site reuse of suitable sediments both for the embankment itself and for the production of precast concrete elements for the bulkhead reinforcement works, thereby reducing the need for external deliveries and improving environmental sustainability. An integrated hydraulic and structural monitoring system has also been developed to support safety during the construction phase and the subsequent management of the structure. This system is capable of predicting the reservoir level based on rainfall, inflow rates and the internal water level, providing operational guidance for the management of the discharge structures. Structural monitoring was also extended to the temporary support structure and the dam body, providing the project management team and the operating authority with a single tool for safety monitoring.

The works were rounded off by optimising the drilling and grouting in the tunnel using progressive densification techniques, and by reducing water ingress through the metal bulkhead using certified joint sealing systems.



Location:	Sicily, ITALY
Client:	Ricciardello Costruzioni S.p.A.
Year:	2025
Work amount:	€1,500,000.00
Categories:	S.05
Services provided:	Detailed Design for the company's improved tender

Piave River

Diaphragm wall works on the left bank of the River Piave

The planned works involved the construction of a levee diaphragm along the section of the left bank extending southwards from the roundabout at the access point to the road bridge in the municipality of Ponte di Piave, up to approximately the municipal boundary with Salgareda. The aim of the project is to eliminate the possibility of siphoning or seepage in the event of flooding of the River Piave. Based on the investigations carried out, models were developed of the possible hydraulic seepage flows that may occur within the embankment and the area beneath it during flood events. The stability analysis was carried out using the Jambu method, considering circular surfaces, whilst for the siphoning phenomenon, the area most critical to this phenomenon – located at the foot of the embankment on the countryside side – was analysed, both with and without the proposed impermeable diaphragm. Subsequently, an infiltration analysis was carried out. The diaphragm was constructed using the jet-grouting technique, a design solution commonly applied in similar cases. Among the particular features of the project, of significant importance is the interference of the construction site with the local road network, and more specifically with the provincial road S.P. 34 ‘Sinistra Piave’, as this is a vital artery for road links to the coastal area of Jesolo.



Location:	Veneto, ITALY
Client:	Veneto Region
Year:	2019 - 2021
Work amount:	€1,800,000.00
Categories:	D.02, S.05
Services provided:	Final and Detailed Design, Health and Safety Coordination during the Design Phase

New Water intake from the Boite Stream

Strategic water infrastructure to enhance the snowmaking capacity of the Socrepes–Pocol–Tofana ski area, in preparation for the Milano-Cortina 2026 Winter Olympic Games

As part of the works associated with the XXV Milano-Cortina 2026 Winter Olympic Games, our team oversaw the design of the new infrastructure to enhance the artificial snowmaking system in the Socrepes-Pocol-Tofana ski area, in Cortina d’Ampezzo (BL). The project involved the construction of a temporary water intake on the Boite stream, in the Cadin di Sopra area, and the pumping of water to the ‘In Po’ Drusciè’ storage reservoir via an underground pressurised pipeline approximately 3.5 km long. The system ensures that the water required for snow production on the Olympic slopes is met, whilst safeguarding the water body and the valuable surrounding environment.

The project was designed in accordance with current environmental regulations, in compliance with landscape restrictions and the management plans for the UNESCO sites and the Ampezzo Dolomites Nature Park, ensuring the utmost sustainability of the works.



Location:	Veneto, ITALY
Client:	Infrastrutture Milano Cortina 2020-2026
Year:	2025
Work amount:	€3,476,582.94
Categories:	D.04, IA.03, S.03
Services provided:	Technical and Economic Feasibility Design, Health and Safety Coordination during the Design Phase

Re-Cobello Stream

Hydraulic regulation and safety measures for the Re-Cobello stream in the municipalities of Barone, Ceto and Niardo (Brescia)

From emergency response to reconstruction: a project designed to enhance the resilience of the local area. Following the exceptional weather events of July 2022, which affected the Re and Cobello streams, causing debris flows and widespread damage in the municipalities of Braone, Ceto and Niardo, the Province of Brescia launched a comprehensive programme of measures to mitigate hydraulic and hydrogeological risks along the entire length of the stream. The contract in question involved the demolition and reconstruction of the existing concrete channel, increasing its average flow cross-section from 7x5m to 25x6m over a length of approximately 740 ml, including the reconstruction of two road bridges, reinforced concrete bank walls, access paths within the riverbed for maintenance, and the paving of the riverbed. For the final section, however, the project involved the construction of bank revetments and environmental regeneration of the area surrounding the confluence.

The project also involved the integration of the existing monitoring system, initially used for site management but intended to remain as a permanent resource for the local community. In this way, the local area will have a more effective tool for managing Civil Protection alerts. Specifically, the system was upgraded with the installation, within the catchment area, of a rain gauge, a tear-off sensor and 15 point sensors for measuring temperature. The latter have enabled the development of an innovative warning model, based on temperature variations within the catchment area, which have proved to be a significant factor in triggering extreme weather events. The project was developed entirely within a BIM environment, ensuring interdisciplinary coordination and design control.



Location:	Lombardy, ITALY
Client:	Province of Brescia
Year:	2024 - 2025
Work amount:	€12,773,993.96
Categories:	D.02, S.04
Services provided:	Detailed Design, Health and Safety Coordination during the Design Phase

Hydraulic Risk Classes

Inspections and hydraulic risk assessment of existing bridges, in accordance with Ministerial Decree of 17 December 2020

The contract involves carrying out hydraulic inspections and defining the Hydraulic Risk Classes (CdA) associated with the hydraulic risk of 36 river crossings along the state road network in Friuli-Venezia Giulia, as part of activities commissioned by ANAS S.p.A. in accordance with the Guidelines for the classification and risk management of existing bridges (Ministerial Decree of 17 December 2020).

The work was carried out at different levels of detail, comprising visual inspections (Levels 1 and 2) and Level 3 preliminary hydraulic assessments, aimed at analysing the main risk mechanisms such as overtopping, generalised erosion and localised erosion. The assessments were carried out by integrating census data, literature reviews, field surveys, geomorphological and hydraulic analyses, as well as consultation of catchment planning instruments (PAI, PGRA).

The results made it possible to assign a Hydraulic Risk Class to each structure and to identify the most appropriate next steps, such as Level 4 modelling studies, monitoring programmes or mitigation measures. The activities were carried out on homogeneous groups of structures, organised by kilometre sections, ensuring methodological consistency and supporting the prioritisation of intervention measures across the network. The assignment also involved updating the classes within Anas S.p.A.'s dedicated portal known as 'BMS'.



Location:	Friuli-Venezia Giulia, ITALY
Client:	ANAS S.p.A.
Year:	2024 - 2025
Work amount:	€89,640.74
Categories:	D.02
Services provided:	Inspections and Determination of Attention Classes (Levels 1, 2 and 3), Hydraulic Risk Analysis, Support for Intervention Planning

Snowmaking in the Bormio ski area

Strategic for high altitude for the controlled snowmaking programme for the Milano-Cortina 2026 Winter Olympic Games

The Bormio (SO) ski area is one of the strategic venues selected for the men’s alpine skiing competitions at the Milano-Cortina 2026 Winter Olympics. To ensure optimal snow cover ahead of the event, our Alpine Department has overseen the design and construction of a key project: the upgrading of the snowmaking system, with particular focus on the famous Stelvio run. At the heart of the project is the construction of a new open-air storage reservoir, with a capacity of approximately 88,000 m³ at an altitude of 2,290m above sea level, perfectly integrated into the alpine landscape. The project includes a retaining embankment, water supply and drainage systems, avalanche barriers, and the reprofiling and refurbishment of the ski runs involved. Every phase of the project was developed using a multidisciplinary and innovative approach, with a focus on site safety, minimising environmental impact and optimising logistics. Our engineering contribution ensured a balance between Olympic requirements, technical efficiency and environmental sustainability. An iconic project that combines vision, technical precision and a sense of local responsibility, serving the world of sport and future generations.



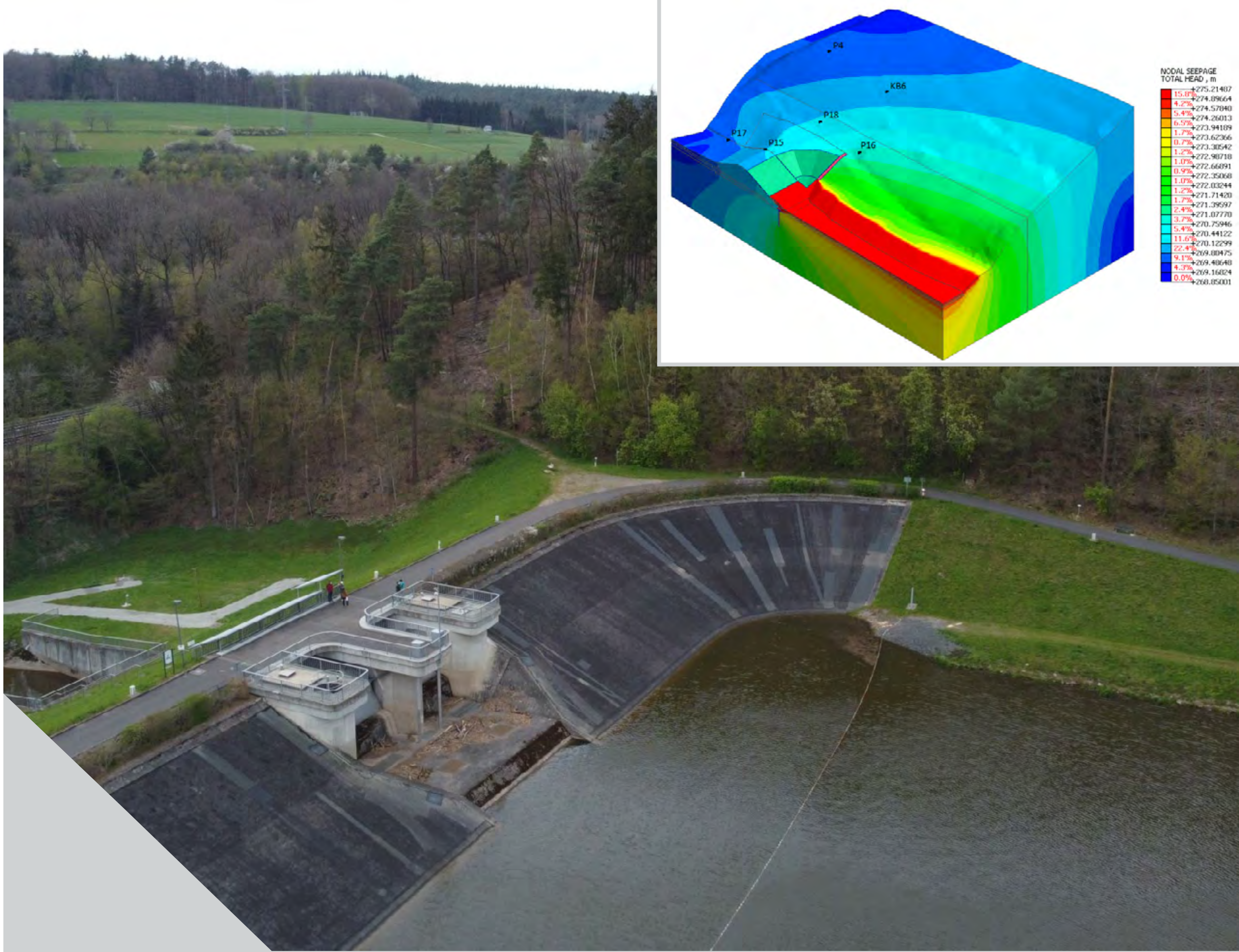
Location:	Lombardy, ITALY
Client:	ARIA S.p.A. - Regional Agency for Innovation and Procurement
Year:	2023 - 2026
Work amount:	€8,026,626.78
Categories:	S.05, IA01, D.04, S.03, V.02
Services provided:	Final and Detailed Design, Construction Supervision, Health and Safety Coordination during the Design and Construction Phases

Haune Dam

Assignment for hydraulic and geotechnical assessments of the overall stability of the Haune Dam – Germany

The aim of the project is to carry out an in-depth examination of an existing earth dam, in order to provide a clear picture of the structure’s condition in terms of safety and, consequently, to offer a general overview useful for planning future maintenance works. Based on existing piezometric data and available photogrammetric surveys, as well as all available historical documentation, 2D cross-sections were analysed using finite element software to carry out the main checks required: stability of the dam faces, and checks for seepage, siphoning and erosion.

Particular attention was paid to the area where the dam body meets the adjacent slope: the configuration of this junction is unclear, no in-depth geotechnical investigations have been carried out, and the measuring instruments located there show a more pronounced response to changes in the water level within the reservoir than instruments situated at greater distances. For this reason, it was necessary to create a 3D model of the entire slope and the dam’s toe section, with the aim of studying the hydraulic behaviour in the area of interest under normal conditions and during a flood event. The data obtained showed an excellent correlation between the model and reality, thus enabling the identification of an area exhibiting anomalous behaviour which requires further geotechnical investigations to define a more precise geological model of the subsoil.



Location:	GERMANY
Client:	Ingenieurburo Professor Kuhlmann
Year:	2021 - 2022
Work amount:	€35,000.00
Categories:	S.05
Services provided:	Geological and Geotechnical Modelling, Safety Assessments

Lenzino Bridge

Construction works for the permanent bridge over the River Trebbia in the municipality of Corte Brugnatella (PC)

Following the collapse of the Lenzino Bridge on 3 October 2020, caused by the failure of the central pier coinciding with exceptional flooding of the River Trebbia, the hydrological and hydraulic modelling of the watercourse played a key role in the design of the new bridge on the S.S. 45.

The design flow rates were estimated using hydrological analysis and modelling, whilst the modelling of the hydrodynamic and morphological behaviour of the River Trebbia – for the section limited to the area under consideration – was carried out using a two-dimensional moving-bed model and a fixed-bed model. This enabled the determination of the maximum scour depths, hydraulic head and velocity values for the various design scenarios: EXISTING CONDITIONS, with the temporary bridge and both piers of the old collapsed bridge in place; TRANSITION SCENARIO, with the new bridge, the temporary bridge and both piers of the old collapsed bridge in place; DESIGN STATE, with the new bridge and the restored pier of the old collapsed bridge (the temporary bridge and the pier on the right bank having been removed).

Particular attention was paid to analysing the interaction between the new bridge and the old Lenzino Bridge, which is subject to historic and heritage restrictions, as well as to the removal of the old sill, which was also damaged by the collapse. To calculate the stability of the structures, the generalised excavation determined by the moving-bottom modelling was therefore added to the localised excavation, the latter determined using empirical formulas available in the literature.



Location:	Emilia-Romagna, ITALY
Client:	ANAS S.p.A.
Year:	2020 - 2023
Work amount:	€25,000,000.00
Categories:	D.02, S.04, S.05, V.02
Services provided:	Final and Detailed Design





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